Space Weather Forecast

Issued on Monday, 17 April 2023 at 12:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate-class X-ray flares (R1-R2 Minor-Moderate radio blackouts), and a slight chance of Strong-Class flares (R3 strong radio blackouts) throughout. Increasing chance of Minor Geomagnetic Storms on 19-20 Apr with a slight chance of Moderate or Strong Geomagnetic Storms on the 20 Apr due to possible CME (coronal mass ejection) arrival.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low, with only two notable Common-class flares. One was from a region just behind the east limb during 16 Apr, with a further high energy Common-class flare from a region in the southeast quadrant. There are nine active regions in total on the visible disc, with two of the larger regions, one in the northeast quadrant and one close to the southwest, carrying the majority of the flare region. A string of three regions in the southeast quadrant also collectively present a significant risk of significant flare activity. A CME which left the eastern limb of the Sun during 16 Apr is not forecast to affect the Earth. No further potential Earth-directed CME have been observed on available imagery in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind was at background levels for much of the period, but started a steady rise towards slightly elevated values early on 17 Apr, possibly due to a weak connection to a fast solar wind region. Total magnetic field strength was mainly at weak levels, but reached high levels late in the period. The important north-south component varied weakly for much of the period, before a sharp southward rotation to moderate levels at the end of the period. Geomagnetic activity was Quiet.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be mainly Low, with a likelihood of Moderate activity through the next four days. There is a slight chance of isolated Strong activity.

Solar Wind / Geomagnetic Activity: Two CMEs are forecast to affect the Earth in this period. One, as a low confidence glancing blow on 19 Apr, with a further more direct near full halo on 20 Apr. Otherwise solar winds are expected to remain mainly at background, with a possible brief rise to slightly elevated values as a result of a weak fast solar wind on 17 and 18 Apr. A further fast solar wind is possible late on 20 Apr, but this may be masked by the forecast CME arrival. Geomagnetic activity is forecast to be mainly Quiet to Unsettled, with a chance of G1/Minor Storm intervals on 19 and 20 Apr. There is also a risk of G2/Moderate or G3/Strong storms on 20 Apr depending on the strength of the CME arrival.

Energetic Particles / Solar Radiation: Solar radiation storms are not expected and should remain at background levels, although there is a slight chance of a greater than S1 event as some of the more complex active regions transit towards the western solar hemisphere, where they are more likely to connect with the Earth.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	20	40
Strong	G3	No	1	1	1	10
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	60	60
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	10	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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